Role of Studio System in Basic Teaching of Design Disciplines Based on Evaluation Model

Wenguang Wang

Yancheng Institute of Technology, Yangcheng224051, China

Abstract

Nowadays design disciplines have become popular. The demand for design talents is increasing day by day due to high growth in all industries. Integrating practice with theory to cultivate design talents becomes the key of basic teaching of design disciplines. For this purpose, in consideration of actual development of vocational colleges, this paper, firstly, introduces theoretical knowledge of studio system in basic teaching of design disciplines and identifies existing problems in the application. Secondly, analytic hierarchy model and evaluation index system are used to analyze selected target, rules and evaluation object. Then with peer evaluation and student evaluation, a judgement matrix is constructed. Finally, research results are verified by algorithm. The experiment shows that studio system plays a more obvious role in basic teaching of design disciplines.

Keywords: Studio system, Design discipline, Basic teaching, Evaluation.

1. RESEARCH BACKGROUND

1.1 Literature review

In the 1980s, a teaching model of “studio system” in China is firstly introduced to Central Academy of Craft Art and Hunan University, etc., and subsequently expanded to other Chinese professional colleges of arts design, where remarkable effects are achieved using this model (Xu and Li, 2015). At present, the teaching model of “studio system” is mainly characterized in decoration environment based on enterprise site, teaching based on studios and project practice, and teaching management depending on enterprise experts (Tai et al., 2015). In recent ten years, the model has been popular with and respected by vocational colleges because its training objective is to set studios in campus, integrate studios with teaching, teach students with practices and make teachers capable of studio work. A studio can also be used for teacher teaching, student competition, project R&D and skill development. The main concept of this model is to introduce studios to teaching by referring to enterprise processes and management mode, so as to optimize the management and evaluation of courses (Ye, 2010). It can be seen from above that the studio system requires projectizing teaching contents and teachers should arrange training contents according to the projects. Professionalization of learning situation requires teachers to change studios to enterprise sites. In addition, products finished by students are socialized outcomes of learning, which can be widely promoted and applied outside the campus. The essence of the above three factors is to keep the learning environment and projects real and apply the outcomes of studios to avoid unnecessary long-time simulation.

Furthermore, extended business and teaching tasks are two important attributes of the studio model. If an instructor cooperates with enterprises and brings studio projects to enterprise, these projects will become important teaching project; if all studios are supported by and combined with design enterprises, students of the studios can also be able to be an assistant designer of the design enterprises (Chen and Qin, 2014). In this way teaching can be combined with actual jobs to give great sense of achievement to students, boost their study enthusiasm, and effectively encourage their learning. Meanwhile, actual projects have higher requirements for teachers. If teachers lack practical ability, it’s difficult for them to introduce their designs to actual projects. So teachers should continue to exploit their own potentials. What’s more, studio teachers can irregularly organize students to take part in competitions to show their skills and team awareness. If students get awards, the studios will become well known and a win-win situation is so achieved.
1.2 Research objective

Graduates under traditional design disciplines are weak in practices and, when they enter the society, they are weak in their jobs. So an important research direction of this paper is to build a studio system mode for educating and cultivating talents of design disciplines, who are both good at learning and practices. For this purpose, according to actual development of vocational colleges, this paper firstly introduces theoretical knowledge of studio system in basic teaching of design disciplines and identifies existing problems in application. On this basis, an analytic hierarchy model is used to design the goals, rules and evaluation object; an evaluation index system is further used to analyze the selected hierarchy; then, peer evaluation and student evaluation are used to construct the judgement matrix; finally, research results are verified by algorithms. The experiment shows that the studio system plays a remarkable role in basic teaching of design disciplines.

2. STUDIO SYSTEM THEORY AND EXISTING PROBLEMS IN BASIC TEACHING OF DESIGN DISCIPLINES

2.1 Theory for applying studio system in basic teaching of design disciplines

Studios are not only teaching places, which can be regarded as after-school learning places, but also can be used for teachers to organize students for competitions and outside services (Zhou and Fei, 2012). Teachers of the studios should uniformly configure the computers of students and be liable for the management of them. The studio system of design disciplines is to convert the old, boring and inherent teaching into project-based teaching, which enables students to undertake actual projects. At present, the studio system of design disciplines is aimed at fully improving students’ professional and practical abilities in practices by giving good learning environment and facilities to students. (Wang, 2010). Generally speaking, the most important function of design disciplines is to transform visual symbol to audiences. It can be seen from Figure 1 that information is transformed by senders to receivers in visual symbols, and receivers finally enjoyed the works (Hargrove, 2012). In the process, a studio has great effects. What’s more, such talent cultivation method means the significant change of teaching form. Under the circumstances, experimental training rooms in many colleges are often only open to students during classes, which discourage students who need to learn more in after-class time. But this can be effectively changed by the studio teaching mode, which gives a learning place to students in 24 hours. Therefore, it’s very important to implement the talent cultivation of studio-system. For hardware, different hardware facilities should be allocated according to different requirements for a discipline.

![Figure 1. Design Process of Design Discipline in Studio System](image)

At present, as there are limited jobs in a studio in most schools and it is difficult for a single studio to satisfy teaching and learning of most students. More teachers should participate in studio building, jointly manage one studio or build up different studios according to their disciplines and specialities. Then, students are allocated to each studio according to their interests and hobbies, so as to ensure full participation of students in studio learning (Cennamo and Brandt, 2012). If some students had interests in several studios, it is necessary to carry out a mode where students guide students. For example, teachers in a studio can develop some elite backbones, who can guide other students in after-school time to keep their progress.

The teaching essence of design disciplines is the two-way teaching, where teachers and students are inseparable. It’s very important to determine how to combine them tightly (Çikis and Ek, 2010). At present, there are high requirements for basic teaching in design disciplines of high vocational colleges, which require teachers fully mobilize subjective initiative of students in studios and improve their capacity by teaching interaction. It’s an important breakthrough point to improve interaction between teachers and students by participating in actual projects. During operation of design studio, introducing project is also an important part (Chiu, 2010). Apart from that theoretical teaching is necessary in the theory course and at initial stage of certain courses, other teaching contents should be taught based on actual projects. Furthermore, simple project should be selected at initial stage as much as possible according to different learning stages of students in design disciplines, because
at the initial stage of studio teaching, students start their learning from specialized courses and they have not recognized their job responsibilities in studios. They are also unfamiliar with specialized knowledge and professional qualification and it is difficult for them to complete actual projects. A virtual project should be used to guide them at initial teaching stage. As shown in Figure 2, pictures, videos and colours are taken for example
and two-dimensional, three-dimensional and four-dimensional spatial forms are used to expound character design, packaging design, advertising design, animation design and multi-media design and other excellent works. But in the later period of studio teaching, actual projects can be introduced in addition to professional knowledge.

**Figure 2. Dynamic Evolution of Spatial Multi-dimensional Form in Design Disciplines**

### 2.2 Existing problems in the application of studio system in design disciplines

At present, the studio system is widely used in design disciplines but there are following three problems. Firstly, the “studio system” cannot be sufficiently used because it is based on real projects, which are not suitable for all disciplines. Those discipline requiring deep background, athletics, arts and those requiring practices should be operated by enterprises. So only simulated projects can be used for teaching (Öztürk and Türkkan, 2010). From the perspective of professional development, the fact that the “studio system” succeeds only in machinery disciplines has been proved.

Secondly, for development cost, there are very high fees for “studio system” teaching. Generally speaking, there are less than 10 students in a studio and the mentoring system is used for teaching to ensure real-time interaction between teachers and students, thus greatly improving the education costs. Meanwhile, in view of true environment of the above mode, costs are improved for purchasing equipment and arranging the sites. But not all vocational colleges can afford the costs. It can only be afforded by those colleges with sufficient funds and strong economic strength. At this stage, the studio system is only extended to colleges in southeast coastal developed regions. It is difficult for this mode to be expanded in central and western regions with underdeveloped economy.

Thirdly, from the perspective of development history, it is difficult for teacher studios to be developed along with enterprises. The key point for attracting and cultivating talents is to build up real environment in enterprises and develop double-teacher studios into enterprise workstations. It can be seen from this process that studios and enterprise workstations play leading roles in cultivating talents, which requires colleges to attract enterprises to participate in talent cultivation in all available ways. The difficulty lies in that whether an enterprise is willing to cultivate talents depends on its will.

### 3. BASIC TEACHING QUALITY EVALUATION MODEL OF THE STUDIO SYSTEM IN DESIGN DISCIPLINES

#### 3.1 Building an evaluation index system

Generally speaking, evaluation indexes are determined according to evaluation object. Specifically, there are three layers of indexes, i.e. target layer, criterion layer and evaluation object layer, according to different evaluation factors. Furthermore, relationship between evaluation factors can be clarified by judging teaching
quality of the class and giving evaluation. Therefore, it’s necessary to establish a hierarchical structure, which is composed of evaluation index system and evaluation object. Specific design is made for plan layer, criterion layer and target layer, one by one. Specifically, a layer including different factors should be further subdivided. In view of this, peer evaluation and student evaluation are designed herein.

3.1.1 Peer evaluation
In order to ensure relative accuracy of evaluation results, peer evaluation is conducted to promote implementation of teaching method by using academic level and teaching level. Indexes should be comprehensively integral and relatively independent, i.e. satisfying the formula (1),

\[ \sum_{i=1}^{n} C_{1i} = C_1, C_i \cap C_j (i \neq j) = \emptyset (1) \]

3.1.2 Student evaluation
Following same principles as above, satisfying the formula (2),

\[ \sum_{i=1}^{n} C_{2i} = C_2, C_i \cap C_j (i \neq j) = \emptyset (2) \]

Setting each first grade index \(C_{2i} = \{C_{2i1}, C_{2i2}, ..., C_{2in}\}\), where \(n=4\).

3.2 Determining index weight by analytic hierarchy process
The key of analytic hierarchy process is to build the judgement matrix. \(n\) peer indexes are used to compare upper layer affecting teaching quality in the classroom to constitute a judgement matrix. But for judgement matrix, factors in same level are relatively judged for factors compared in pairs. Most bases or sources of the assignment are independently provided by experts being familiar with evaluation of classroom teaching quality. Specifically, \(n\)-step judgement matrix \(C\) built herein is shown in Figure 3. If any index is assigned to be 1, numerical values at leading diagonal should be 1, i.e. \(a_{ij}=1\); numerical values at two sides of the diagonal line should be mutually reciprocal, i.e. \(a_{ij} = 1/a_{ji}\). It can be seen from this that numerical values in the judgement matrix had following two characteristics.

**Figure 3.** N-stage Judgement Matrix

\[
\begin{array}{cccccc}
C & C_1 & C_2 & C_3 & \ldots & C_n \\
C_1 & 1 & a_{12} & a_{13} & \ldots & a_{1n} \\
C_2 & 1/a_{12} & 1 & a_{23} & \ldots & a_{2n} \\
C_3 & 1/a_{13} & 1/a_{23} & 1 & \ldots & a_{3n} \\
\vdots & \vdots & \vdots & \vdots & \ddots & \vdots \\
C_n & 1/a_{1n} & 1/a_{2n} & 1/a_{3n} & \ldots & 1 \\
\end{array}
\]

Where \(C, C_1, C_2, ..., C_n\) are evaluation indexes; \(a_{ij}, a_{12}, a_{13}, \ldots, a_{2n}\) are weight values set according to rules for quantizing judging results.

3.3 Model solving
C elements are normalized in columns to get that:

\[ \bar{C} = (\bar{c}_{ij}), \bar{c}_{ij} = \frac{c_{ij}}{\sum_{j=1}^{n} c_{ij}}, i, j = 1, 2, 3, \ldots, n; \]

\(\bar{C}\) values are added up in lines to get that:

\[ \bar{W} = [\bar{w}_1, \bar{w}_2, \ldots, \bar{w}_n], \bar{w}_i = \sum_{j=1}^{n} \bar{c}_{ij}. \]

Above weight vectors are calculated to get that:

\[ \bar{c}_{21} = \begin{bmatrix} 0.2522 & 0.5214 & 0.2541 \\ 0.1124 & 0.3451 & 0.3331 \\ 0.0241 & 0.1413 & 0.2101 \end{bmatrix} \]

\[ W_{21} = \{0.5321, 0.1201, 0.2414\} \]

3.4 Final evaluation score and analysis
Finally, \(N_2\) value of evaluation object is calculated to get final score of classroom teaching quality:
The model results show that the final result is 78.2414, which satisfied the verification results, and evaluation on function of studio system in basic teaching of design discipline played a positive effect and had great executability.

4. CONCLUSIONS

In conclusion, interaction between teachers and students plays a positive role in basic teaching of design disciplines. The core concept of “paying equal attention to knowledge and technology and synchronizing theory with practice” also has great effects on the basic teaching of design disciplines. At the present stage, the studio system plays an important role in China’s talent development strategy. It’s necessary to provide more diversified education reform and education practice to encourage student associations and innovation and entrepreneurship activities. So, it’s necessary to maintain the function of education and practices, carry out the studio system accurately, and give full play to it in the basic teaching of design disciplines. For this purpose, there is still large space for the development of design disciplines for pushing the “studio system” ahead in a healthy manner. Specially, the first thing to do is to fully improve the teaching mode and mainly develop the cultivation mode. For education reform results in design disciplines, it’s necessary to improve the talent cultivation mode. The second is to carry out studio education reform in design disciplines of high vocational colleges, and generally allocate funds, policies and credit hours. Furthermore, specific problems should be solved in carrying out the mode. Teachers in design disciplines should also deal with each project and maintain detailed accounts for future examination.

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